

High Density Reference Design for AI

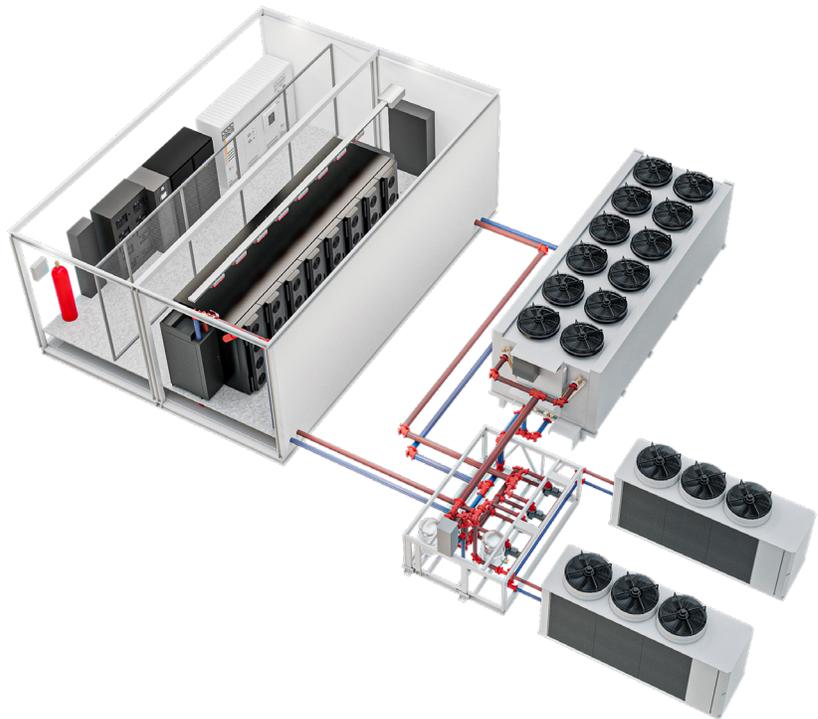
AI Reference Design #0017

340 kW prefabricated HPC data center

A fully prefabricated data center solution designed for a 340 kW IT load with N redundancy using air and liquid cooling for racks up to 75 kW power per rack.

Design Principles

- Completely **prefabricated AI direct-to-chip cooled data center**, including complex pipework, power train and heat rejection systems.
- IT hall area separated from power train to set apart technical from data access.
- **Skidded solutions** possible for quick repurposing of existing space.
- Greatly **reduced** on-site deployment and commissioning **complexity**.
- **Liquid cooling** works in addition with air-cooled technology, splitting the load to reject all the heat from the rack.

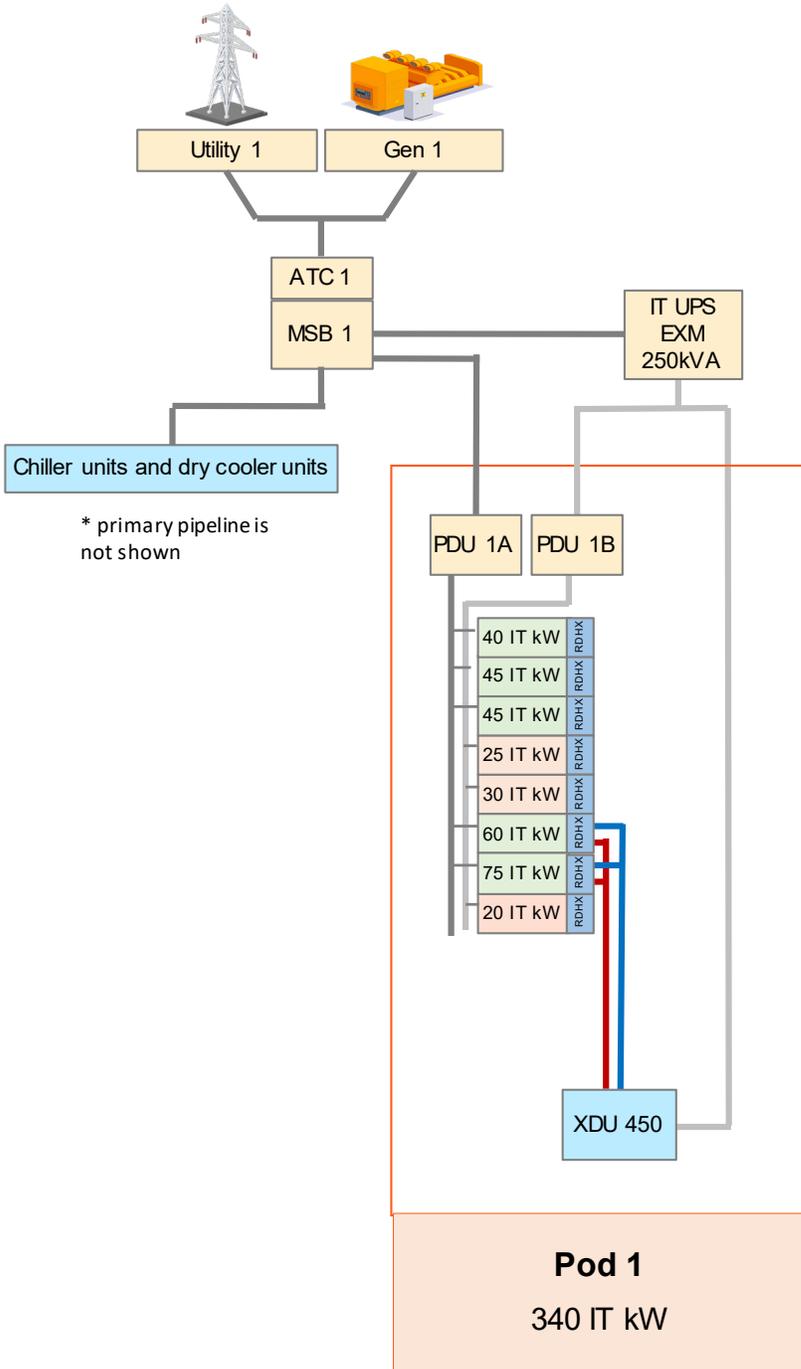


Design Summary

IT Load	340 kW
Building Type	Prefabricated Steel Modules
Electrical Redundancy	N
Rack IT load	20 - 80 kW/rack
Rack(s)	8 Vertiv Knurr DCM Racks
Cooling Topology	70% Liquid (direct-to-chip) 30% Air
Coolant Distribution	Vertiv XDU450
Air cooling	DCD Rear Door Heat Exchanger
UPS for IT	Vertiv EXM2 250 kVA for critical loads

Vertiv™ 360AI

Reference Design Schematic



Legend

Critical Power

Thermal Management

Networking & Storage racks

Compute rack

— Liquid loop, cold/supply
— Liquid loop, hot/return



Utility Supply



Generator

Key Terms

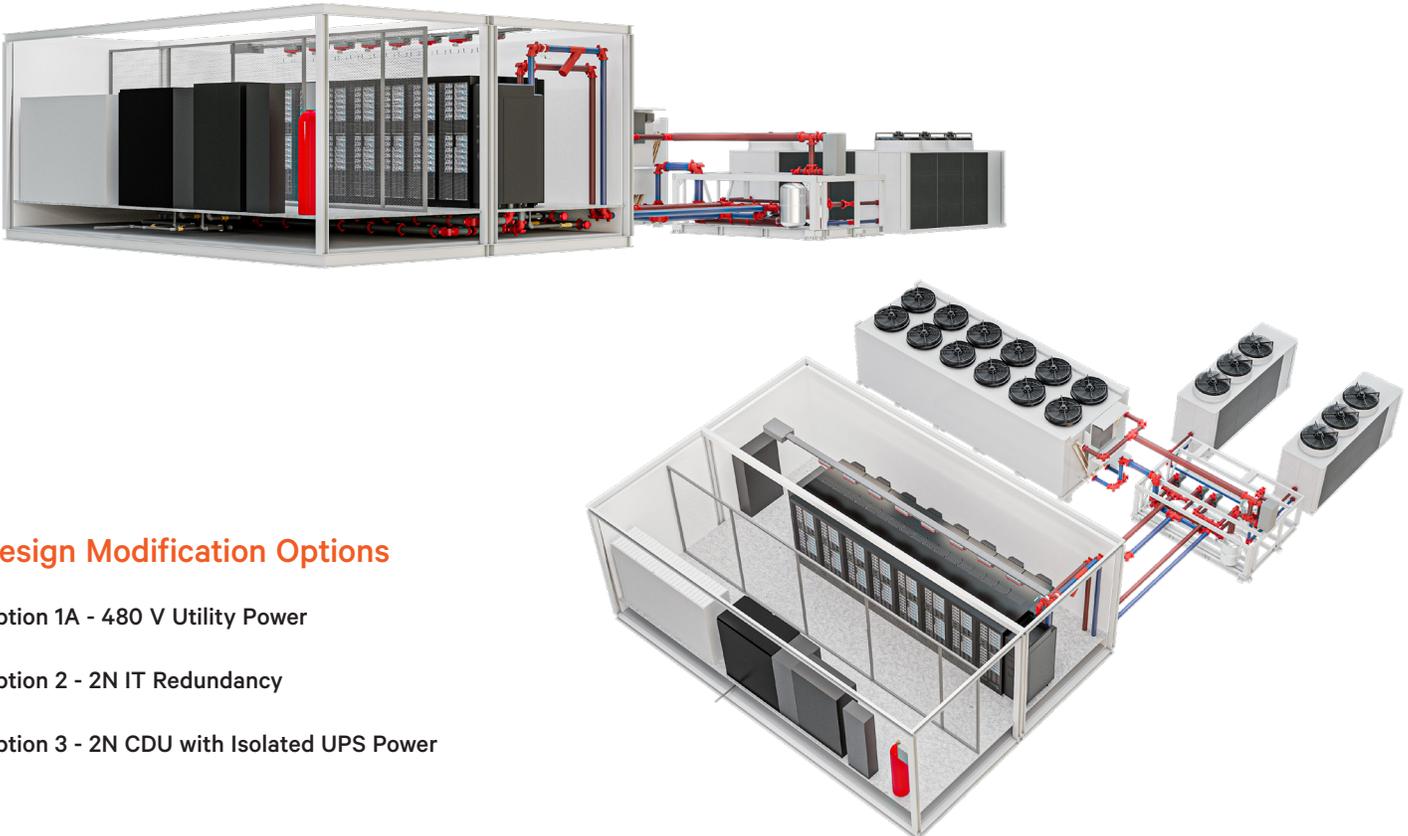
UPS: Uninterruptible Power Supply

PDU: Power Distribution Unit

XDU: Coolant Distribution Unit

Vertiv Components of the Design

Component	Details
Switchboard	1x 1000 A Switchboard
Compute/Network Racks	8x Vertiv Knurr DCM Rack (2200 mm x 800 mm x 1600 mm, HxWxD)
IT UPS	1x 250 kVA EXM UPS
Busbar	250 A busbar for critical load 500 A busbar for non-critical load
Rack PDUs for network & storage racks	3x 22 kW (32 A) rack PDUs per rack
Rack PDUs for compute racks	2x 43.4 kW (63 A) rack PDUs per rack
Rear Door Heat Exchangers	1x Vertiv DCD47 per rack
Coolant Distribution Unit (CDU)	1x Liquid-to-Liquid Vertiv XDU 450
Air Conditioning Units	2x Floor Mounted Vertiv PI025
Chiller plant	1x Dry Cooler and 2x Chillers
Water Storage Tank	4x Water Reserve Storage Tanks
Prefabricated Modular Units	2x 9.7 m Prefabricated Modular Units



Design Modification Options

Option 1A - 480 V Utility Power

Option 2 - 2N IT Redundancy

Option 3 - 2N CDU with Isolated UPS Power

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